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BUREAU OF
ENTOMOLOGY AND PLANT QUARANTINE
NEWS LETTER

2 Little Fire ant - Fla.

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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR SEPTEMBER 1936

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FRUIT INSECT INVESTIGATIONS

Distribution of insects in a raisin stack.--H. C. Donohoe, of the Fresno, Calif., laboratory, obtained information, by sampling the fruit, on the distribution of several species of insects in a stack of boxes of raisins. The dominant species was the raisin moth (Ephestia figulilella Greg.). Alternate boxes of raisins were sampled across the face of a stack that was being dismantled. The cross section of closely piled boxes was about 13½ feet high by 18 feet wide. The raisins had been harvested and stacked in an open-sided shed in the fall of 1935 and the samples were taken on February 25, 1936. The data obtained showed a concentration of larvae of the raisin moth in the lower part of the stack, a condition found in a similar sampling of raisins of the crop of 1934. A less-marked tendency of the insects to concentrate in the outside vertical tiers of boxes was indicated. Other collections from the outside of boxes, from beneath movable foundation timbers, and from soil under the stack showed the presence of about 13,100 larvae of the raisin moth, 172 larvae of the Indian-meal moth (Plodia interpunctella Hbn.), and 277 adults of the saw-toothed grain beetle (Oryzaephilus surinamensis L.) per ton of raisins. Of the first species, 7,600 were living and 5,500 were dead larvae.

Small darkling beetles controlled by use of poisoned-bran mash.--C. K. Fisher, of the Fresno laboratory, reports that during the summer of 1936 beetles, Blapstinus rufipes Casey, were seriously injuring young replanted grapevines in a vineyard near Fresno, as many as 10 beetles feeding on single vines. Because the beetles were very active and scattered rapidly when disturbed and also because some were concealed under the soil, more beetles than were counted may have been congregated around some vines. Damage was apparent by the feeding on young leaves and buds, some of the small leaves and buds being practically all consumed. After preliminary laboratory tests with poisoned-bran mash made approximately according to the formula for grasshopper poison (100 pounds wheat bran, 1 quart of liquid sodium arsenite, and 14 gallons of water), which gave promise of control, this material was tried as a means of control in the vineyard. Instead of commercial liquid sodium arsenite, a 46-percent solution was made with dry sodium arsenite. The poisoned-bran mash was applied between 6:30 and 7:50 p.m. by dropping a small handful around each infested vine in four rows in the vineyard. It appeared that the mash was still fed upon and effective after it had become quite dry. Observations made 48 hours after the application of the bait showed some beetles dead and a few alive, but 9 days after the application observations showed as high as 24 beetles dead around a single plant, with none alive in the vicinity of the plants treated. From 7 to 10 dead beetles around a plant were frequently seen. An occasional living beetle was observed between the rows. Plants receiving no mash showed living beetles and none dead.

Little fire ant troublesome in southern Florida.--The little fire ant (Wasmannia auropunctata (Rodger)) was recorded from southern Florida in 1929 by M. R. Smith, and the same year W. M. Wheeler reported that he had received specimens of this ant from Florida some 5 years earlier. This ant is known from parts of South America, Mexico, and the West Indies and its range out of doors is not considered to extend beyond the subtropics. It does occur, however, in greenhouses at Kew Gardens, England. The species is found in Puerto Rico associated with certain scales and mealybugs in coffee plantations. Recently the little fire ant has been reported as becoming a serious problem in certain districts in southern Florida, particularly in citrus groves.

Flight of peach borer moths.--O. I. Snapp, Fort Valley, Ga., writes that when female peach borer moths are released in a cotton field or a pasture they invariably return to the point of release after making a flight. This habit was observed by Mr. Snapp and J. R. Thomson, Jr., in other years in peach orchards. Female moths were found to deposit most of their eggs on the tree in which they originated. One moth repeated the return flight twice at a distance of 85 yards from the point of liberation. From these observations, the conclusion is made that the female moths apparently have no definite direction of flight and that they are not attracted to nearby peach orchards when released in cotton fields, even though there is a peach orchard in only one direction from the place of liberation.

Delayed control of San Jose scale from liquid lime-sulphur.--The Fort Valley laboratory reports that the degree of control of the San Jose scale from liquid lime-sulphur was found this year to increase between the fourth and sixth month after spraying. The results of the 1935 experiments indicated that the degree of control of the San Jose scale from liquid lime-sulphur increased between the first and fifth month after spraying, and that scale counts made 1 month after spraying are entirely too soon after the material is applied to give dependable determinations of its efficiency as an insecticide for that insect.

Release of Japanese beetle parasite in New Hampshire.--I. M. Hawley, Springfield, Mass., reports that on August 17, 1936, 400 females and 494 males of Centeter cinerea Ald. were liberated at Keene, N. H. This imported dipterous parasite of the Japanese beetle is feebly established in the Moorestown, N. J., district. The flies released at Keene emerged from puparia from parasitized beetles collected at Moorestown in 1935 and held in storage so as to retard development of the flies to meet New Hampshire conditions. Parasitized beetles were recovered soon after the release of the flies on August 24, September 8, and September 15.

Possible 2-year life cycle of Japanese beetle parasite.--M. H. Brunson, of the Moorestown laboratory, reports on the possibility of Tiphia popilliavora Roh. having a 2-year life cycle. In 1935 data were obtained which indicated that possibly T. popilliavora has a tendency toward a 2-year life cycle. Emergence was obtained in 1935 from cocoons carried over from 1933. This year emergence was obtained from cocoons 2 years old and in one instance 3 years old. These cocoons were handled in the usual way, the cocoons being held in a cellar at the average temperature of the soil at a depth of 3 inches throughout the year and cocoons not producing adults were held over the following year. The results are as follows: In 1933 cocoons were obtained from field-collected females. These cocoons were held at the usual temperature for adult emergence in 1934, 1935, and 1936. Adults emerged in 1934 and 1935, and this year, after a period of 3 years, four males emerged from these cocoons. The cocoons are being held for emergence in 1937. In 1934 cocoons obtained as a product of various observations in the insectary were handled in the usual way for adult emergence in 1935. A total of 482 cocoons not producing adults were carried over winter and handled in the usual way for adult emergence this year. From the 482 cocoons, 11 male and 4 female T. popilliavora emerged. These results may be considered as further evidence that T. popilliavora may remain in cocoons for 2 years before emerging as adults. However, this tendency toward a 2-year life cycle may not represent the normal reaction of the insect to conditions as they occur in the field, but may be a reaction to slightly abnormal temperature and humidity conditions as they occur in the cellars used to retain the cocoons.

MEXICAN FRUIT FLY CONTROL

Shipment of citrus fruit from lower Rio Grande Valley to start soon.-- A few days before the end of September announcement was made by the Texas Commissioner of Agriculture that tests for citrus maturity would be made commencing October 1. Practically all of the packing houses are in readiness to begin shipments and it is expected that regular movement of citrus fruit will start soon after the first of the month. The usual heavy September rains have seriously retarded field operations. In many instances it was impossible to reach the groves where traps were located and as a result the number of specimens submitted for identification was unusually low. During this period no Anastrepha ludens Loew were trapped, and only 5 A. serpentina Wied., and 105 A. pallens Coq., were taken.

CEREAL AND FORAGE INSECT INVESTIGATIONS

New parasite of vetch bruchid.--J. S. Pinckney, of the Carlisle, Pa., laboratory, reports having reared the hymenopterous parasite Lariophagus distinguendus (Forst) from Bruchus brachialis Fahr. This parasite has not been previously listed as attacking this species. He has also reared from this pest for the first time in this country the European parasite Bruchobius mayri (Masi).

European corn borer infestation per plant and rate of survival.--L. H. Patch and G. T. Bottger, Toledo, Ohio, report as follows on the number of borers per plant and rate of borer survival according to planting date and strain of corn: Of two strains of hybrid field corn R4 x Hy and A x Tr, of approximately the same silking date, the former was shown to be relatively resistant and the latter relatively susceptible to European corn borer infestation. A series of 10 successive plantings of both strains, from May 7 to June 5, was made in 1936, near Toledo. A sample of plants of each strain was examined in each planting during the season to determine natural egg deposition. The total number of egg masses received by each strain was approximately the same, namely, 780 and 788 by R4 x Hy and A x Tr, respectively. The number of eggs received per planting, however, decreases with later planting, the plantings of May 26 and May 29 receiving approximately half the number laid on the plantings of May 7 and May 11, when either strain is considered. On the other hand the resultant borers in the later plantings were approximately only one-third the number recovered from the earlier plantings, indicating a lower rate of survival in the later plantings. The percentage of survival was reduced from 9.9 to 6.9 percent for A x Tr and from 4.9 to 3.1 percent for R4 x Hy by planting on an average of 19 days later. With regard to strain results, although both strains received approximately the same number of eggs, only half as many borers were dissected from R4 x Hy as from A x Tr, indicating that the survival rate in R4 x Hy was approximately half the survival rate in A x Tr. Since the strains differ in time of silking by only 1 day, it may be concluded that R4 x Hy possesses some inherent factor which contributes to resistance to borer establishment, a factor not present in the hybrid A x Tr. The results discussed above, obtained under conditions of natural infestation, substantiate the selection of borer-resistant and borer-susceptible strains on the basis of uniformly hand infesting the plants with egg masses produced by laboratory methods, which overcomes dependency on heavy natural infestations. Similar results were obtained in 1936, and in previous years, when infestation of the plants was induced by hand methods.

European corn borer in Lake States.--According to A. M. Vance, Toledo, current information on European corn borer abundance in the Lake States was obtained in a survey of 1,388 cornfields, segregated in county or county-group units, conducted during the period August 10 to September 19. The following facts were determined from the survey: (1) A definite decrease in infestation in 1936, as compared with 1935, occurred in eastern Indiana, in the lower two-thirds of the section surveyed in the western half of Ohio, and in the "thumb" section of Michigan. (2) Borer populations in the northwestern corner of Ohio and the southeastern part of Michigan, west of Lake Erie, were at least as abundant in 1936 as in 1935, with significant increases appearing in 11 of the 23 counties comprising the entire section. (3) Corn borer abundance in 1936 remained at the relatively low level of 1935 in counties bordering the Lakes in western New York, and in Centre County, Pa. (4) The corn borer was found to be present in negligible numbers in central Indiana and in the southwestern corner of Michigan. In central Michigan, however, the insect was as abundant as in the older eastern infested counties of the State. Drought again appears to have been chiefly responsible for checking the corn borer in western New York and in a large westerly part of the infested territory in Michigan, Ohio, and Indiana. However, including the reduction of borer populations in the southern two-thirds of surveyed Ohio and in the "thumb" of Michigan, the average number of borers per 100 plants for all comparable counties and county groups in the two States increased in Ohio from 36.8 in 1935 to 50.6 in 1936 and in Michigan from 45.7 in 1935 to 57.8 in 1936.

European corn borer in Eastern States.--Mr. Vance also reports that in a similar survey of 760 cornfields in the Eastern States during September the following facts were determined: (1) Significant increases in borer abundance, from 1935 to 1936, appeared in southwestern Vermont, central Massachusetts, eastern Connecticut, Rhode Island west of Narragansett Bay, and in Monmouth County, N. J. (2) With the exceptions of Essex and Bristol Counties, Mass., where populations of the borer remained about the same in 1936 as in 1935, there was a lower infestation this year than in 1935 along the Atlantic coast from York County, Maine, to and including Bristol and Newport Counties, R. I. (3) Borer populations, in 1936, in northwestern Vermont, in Hartford and New Haven Counties, Conn., and in the Atlantic-Burlington-Ocean County group in New Jersey, remained at the approximate levels of 1935. (4) In Middlesex County, Conn., and on Long Island and the Eastern Shore of Maryland and Virginia, there occurred definite decreases in the abundance of the insect from 1935 to 1936. (5) The heaviest concentrations of the borer continued to be in southern New England and Long Island, N. Y., with only a light infestation appearing in Maine and New Hampshire in 1936. (6) Borer infestation was found in several cornfields in Sussex County, Del., in 1936, where a fall-infestation survey was conducted for the first time.

European corn borer on Virginia mainland.--Mr. Vance reports a first record of the European corn borer on the mainland of Virginia, made by H. G. Walker, of the Virginia Truck Experiment Station at Norfolk. Dr. Walker collected 18 borer larvae in Princess Anne County, Va., on August 28, 1936, which have been determined by Carl Heinrich as Pyrausta nubilalis Hbn.

JAPANESE BEETLE CONTROL

Japanese beetle scouting concluded for season.--Late-season nursery and greenhouse scouting in northern New York and Connecticut was concluded on September 12 and the crews working in the other New England States were dismissed on September 19. Trucks and other equipment used by the crews in New York and Connecticut were returned to the New Cumberland, Pa., warehouse. Trucks used by five New England crews were temporarily stored at Greenfield, Mass., for later use in connection with bough and Christmas tree inspection work. Japanese beetles were found on the premises of 19 classified nurseries and greenhouses in New England and within 500 feet of 4 other nurseries.

Violator of Missouri State quarantine prosecuted.--Acting on evidence obtained by O. K. Courtney, the division's representative in St. Louis, the Missouri Department of Agriculture entered a complaint against J. T. White of St. Louis for a violation of Missouri Intrastate Quarantine No. 1 on the Japanese beetle. The charge involved transportation of a truckload of dirt from a location in the St. Louis quarantined area to a dump near the Mississippi River. The defendant was hailed before the St. Louis Court of

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Criminal Correction on September 15 and, after entering a plea of guilty, was fined $25 with a stay of execution for good behavior. The good-behavior requirement included return of the dirt to the quarantined zone.

Fruits and vegetables quarantine lifted.--With the near-disappearance of the adult Japanese beetle, as evidenced by freedom from infestation of farm products offered for inspection, it became possible on and after September 22 to lift the restrictions on the movement of fruits and vegetables. Certification requirements for cut flowers will be maintained until October 15, since the few beetles still in the field are largely found deep in the blooms of outdoor-grown flowers, many of which are still being offered for inspection. Lifting of the seasonal quarantine resulted in the dismissal of approximately 60 inspectors who had been assigned to this activity.

Inspection demands in Pittsburgh.--There was a considerable increase in cut-flower inspections during September, as compared with the previous month, the number of individual inspections increasing from about 20 to approximately 45 per day. The October outlook is even better than September's. Fruit and vegetable inspection, however, decreased during September, owing to the maturing of home gardens and locally grown crops. A number of large palms, ferns, and rubber plants have been made soil-free and have been repotted in certified soil preparatory to being placed in certified greenhouses where they are "boarded" for individual owners during the winter.

Japanese beetle quarantine violator fined.--In the first prosecution ever instituted in a nonregulated Southern State for a violation of the Japanese beetle quarantine regulations, Earl Davis, of Knoxville, Tenn., was fined $25 for the transportation to Knoxville on June 20 and July 9, 1936, of uncertified farm products from Norfolk, Va., and Baltimore, Md., respectively. The defendant was arraigned in the United States District Court in Greeneville, Tenn., on September 21, at which time he entered a plea of guilty. Both of the interceptions were made by road inspectors stationed on highways leading from the regulated area.

Motor-driven debeetler speeds inspection.--An electric motor installed on one of the new bean machines located at Berlin, Md., has increased the capacity of the machine from 109 to 180 bushels per hour. The riddling cylinder is driven at 45 revolutions per minute. At this inspection center the beans were packed in bushel baskets and the baskets moved on rollers to the car. With this arrangement, a car of string beans may be run through the machine, packed, and loaded in approximately 3½ hours.

North Carolina official assigned to Japanese beetle work.--A conference was recently held by field representatives of the Bureau with R. W. Leiby and J. Thomas Page, concerning enforcement of the North Carolina Japanese beetle quarantine regulations. Mr. Page has been designated as enforcement officer for the State order.

Egg clusters removed from inspected products.--Among the hundreds of shipments inspected during this period, 13 were found to contain gypsy moth infestation. From 11 consignments of forest products and 2 lots of nursery stock there were removed prior to certification 36 egg masses and 2 pupae of the gypsy moth. One of these clusters was taken from a shipment of 15 evergreens that were to be used as samples by a salesman working outside the infested zone. Ten of the egg clusters were removed from a carload of shims inspected at Deering Junction, Maine, for transportation to a nonregulated portion of the same State. Five more egg masses were found on car stakes destined from Conway, N. H., to Jersey City, N. J.

Corn borer infestation conditions in New Jersey.--Occasional inspections have been made of corn fields in Mercer County and vicinity, with the result that considerable corn borer infestation has been found. In the vicinity of Cranbury several heavily infested fields were located. Many of the hills in these fields were broken over, owing to the borer. Examination of both stalks and ears disclosed as many as five borers per ear, with an average stalk infestation of three borers. Reports for other sections of the State indicate that the borer has increased considerably and that scouting would probably have disclosed many new infestations. This increase in borer population has added to the inspection activities involved in the certification under State corn borer quarantines of chrysanthemums, dahlias, and asters grown in the infested sections.

Dutch elm disease infection at Branford, Conn.--One of the most outstanding single infection discoveries of this season involves a 6-inch elm at Branford, New Haven County, Conn. This location is approximately half way between the major infected zone in Fairfield County and the isolated point where four confirmed trees were found at Old Lyme. Discovery of this tree is the first indication that the disease exists in the intervening stretch of approximately 55 miles between the two areas. This tree exhibits discoloration in annual rings prior to 1936, indicating the probability that the fungus entered the tree several years ago. A preliminary elm census in the adjoining territory shows approximately 26,000 elms within a 5-mile radius of the confirmed tree. Of this census, over half the elms are within a 1-mile radius. Within this mile radius there are between 3,000 and 4,000 dead or more-than-half-dead elms, in some of which engravings of Hylurgopinus rufipes Eich. were found.

Isolated Dutch elm disease infection found.--Confirmation was received during this period covering a tree within 50 feet of the Baltimore & Ohio Railroad tracks near Cumberland, Md. Cumberland is 66 miles west of the Brunswick, Md., infection and 114 miles west of Baltimore, where an infection was previously discovered. Another infected tree was discovered in Hopewell Township, Mercer County, N. J., necessitating a further extension of the major infected zone.

Systematic scouting nearing completion.--Autumnal yellowing of elm foliage will soon force discontinuance of scouting for Dutch elm disease infected trees. During the biweekly period ending September 26 there were reported 451 confirmations.

FOREST INSECT INVESTIGATIONS

Fort Collins laboratory in new quarters.--J. A. Beal, of the Fort Collins, Colo., laboratory, reports that with the completion of the Forestry Building early in September, on the Colorado State College campus, the laboratory was moved from the Administration Building to the second floor of the Forestry Building. This is a modern, two-story structure which now houses the Forestry School, the Rocky Mountain Forest and Range Experiment Station, and the Forest Insect Laboratory. The laboratory personnel occupies three office rooms and has the joint use of a large laboratory room with the experiment station. The new address is 210 Forestry Building.

Black Hills beetle increasing on Elk Mountain.--According to J. M. Whiteside, of the Fort Collins laboratory, infestation by *Dendroctonus ponderosae* Hopk. on the Elk Mountain area in southern Wyoming has increased rapidly since 1934. The following data on a typical 8-acre strip plot, ranging in elevation from 7,800 to 10,000 feet and covered with an even mixture of lodgepole pine and limber pine, indicate the peculiarities and general trend of this epidemic.

Host tree	Attacks in--		
	1934	1935	1936
	Number	Number	Number
Limber pine-----	26	85	278
Lodgepole pine--	17	40	45
Total-------	43	125	323

Based on the total number of trees attacked this infestation has increased at the rate of about 300 percent each year, although a decided preference for limber pine is noted. The trend of the epidemic in direction is toward the top of the mountain. Most of the trees attacked in 1934 were found between 8,000 and 9,000 feet elevation. Practically all of the 1935 trees were above 9,000 feet. In 1936 about 85 percent of the attacks were above 9,500 feet, most of them being about 10,000 feet. Since the available host material around 10,000 feet is very limited, it will be interesting to know where the beetles will go following the 1937 emergence.

Successful control project against Black Hills beetle.--Mr. Beal also reports that the serious outbreak of this beetle, which has resulted in the loss of some forty million board feet of ponderosa pine timber on the Montezuma National Forest during the last 5 years, has now been successfully brought under control. The control campaign initiated by the United States Forest Service in 1933 and continued up to the present time, has so reduced the bark beetle population that it is now extremely difficult to find even an occasional infested tree. However, on parts of the forest hundreds of large, old, dead "bug trees" still stand as indicators of the severity of this outbreak prior to the beginning of control work. During the treating work about 20,000 trees averaging 1,000 board feet each were removed and destroyed. It is believed that an equal volume of timber was lost preceding and during control operations. The success of this bark beetle-control project, starting after the outbreak had gained considerable headway indicates the degree of success we may expect in protecting the ponderosa pine stands of the Rocky Mountain region from future bark beetle outbreaks.

Ambrosia beetles attack fire-killed Douglas fir in Oregon.--A complex association of insect species contribute to the deterioration of fire-killed Douglas fir, but only a few cause destruction of the heartwood and hence are important factors to consider in salvage logging, according to R. L. Furniss of the Portland, Oreg., laboratory. Platypus wilsoni Sw. is a recent addition to the list of destructive species. During August and September of the current year, this insect began attacking numerous dead firs in the fog belt near Foss, Oreg. P. wilsoni normally attacks weakened, windthrown, or fire-killed western hemlock along the North Pacific coast. Douglas fir is only occasionally attacked and the present case is the only example of damage noted in the examination of some 60 burned areas.

Pine beetle damage moderates in Pacific Northwest.--F. P. Keen, of the Portland laboratory, reports that a marked reduction of western pine beetle damage in ponderosa pine in Oregon is evident from the preliminary results of this year's survey. Five three-man crews have checked nearly 3,000,000 acres for beetle damage and only a few areas show aggressive epidemic losses for this year.

Smaller European elm bark beetle found in West Virginia and Ohio.--Scolytus multistriatus Marsh. was recently found to be established in Parkersburg, W. Va., by the Bureau's Dutch elm disease eradication unit. C. H. Hoffman, of the Morristown, N. J., laboratory, spent the latter part of September scouting in the country surrounding Parkersburg to determine the limits of the infested area. By the end of September the species had been found over an area approximately 100 miles in diameter and covering parts of West Virginia and Ohio. The beetle had previously not been reported from either State.

Does 17-year Cicada transmit Dutch elm disease?--During 1936 the 17-year locust was abundant at certain points in New Jersey. Because of the oviposition punctures the females make in the twigs and small branches of various trees, including elm, it was thought that they might act as transmitters of the Dutch elm disease fungus. During the latter part of June adults were collected at Trenton, N. J. They were placed in an outdoor cage at the Morristown, N. J., laboratory. Freshly cut branches of an elm affected with the disease were placed in the cage. Fifty-three females found ovipositing in the branches were removed immediately after each had inserted most of the ovipositor into the wood. The ovipositors were removed from these females and cultured by the Division of Forest Pathology, Bureau of Plant Industry. The fungus was not recovered from any of the ovipositors. Eight samples of the branches were later cut and submitted for culturing. Although the branches were very dry at the time, the fungus was obtained from four of the samples.

Defoliation by hemlock looper.--J. V. Schaffner, Jr., of the New Haven, Conn., laboratory, reports on the effect of defoliation of hemlocks at Warwick, Mass., by Ellopia athasaria Walk. Sixty trees were numbered in

1934 and their condition was recorded as good. The DBH measurements ranged from 4 to 12 inches, with an average of 8.5 inches. In 1934 defoliation ranged from 70 to 100 percent and in 1935 the average defoliation was approximately 90 percent. In 1935, 45 trees were recorded as fair, 8 as poor, and 7 as dead. In 1936, 39 were fair, 12 were poor, and 9 were dead. Greatest mortality occurred in the dominant and codominant crown classes. None of the suppressed trees died.

Mortality of forest tent caterpillar.--Mr. Schaffner reports that 1,348 full-grown larvae and cocoons of Malacosoma disstria Hbn. were collected late in June in nine heavily infested localities in Vermont to obtain data on parasitization and moth issuance. The data have been summarized recently with results as follows: Total number of moths issued, 441, or 32.7 percent; number parasitized by tachinids, 248 and by Hymenoptera, 125, or 27.7 percent; mortality by wilt disease and unknown causes 534, or 39.6 percent. A total of 273 maggots, probably all sarcophagids, which are considered as scavengers and not parasitic, issued from those listed as dead from disease and unknown causes.

Liberation of spruce sawfly parasites.--P. B. Dowden and P. A. Berry, of the New Haven laboratory, report as follows on parasite investigations for the month: "On September 4 a shipment of 200,000 Microplectron fuscipennis Zett., and on September 23 a shipment of 100,000 of the same species, were received from the Canadian parasite laboratory at Belleville, Ontario, for liberation against the spruce sawfly Diprion polytomum Htg. The shipment of September 4 was liberated by the Maine Forest Service at five localities in northwestern Maine. The shipment of September 24 was liberated from New Haven at the following points: Petersham, Mass., 40,000; Orange, Conn., 30,000; Kent, Conn., 30,000.

Tests of sprays for spruce sawfly.--S. F. Potts, New Haven, reports as follows on the control of the European spruce sawfly: "Final observations on sprayed plots show excellent control by derris residue, derris, lead arsenate, calcium arsenate, and lime sulphur. Poor control resulted from nicotine in any form, pyrethrum, bordeaux mixture, and phenothiazine."

Experiments with sprays for use with autogiro.--Mr. Potts also reports on observations continued on hand-sprayed plots with various mixtures to be tested later in autogiro-spraying experiments. The observations show that excellent atomization is possible and that the adherence of the autogiro mixtures is greater than the adherence of mixtures ordinarily used in ground spray work. Lead arsenate, calcium arsenate, derris, derris residue, pyrethrum, rotenone, nicotine tannate, bordeaux mixture, and lime sulphur were prepared successfully as autogiro mixtures.

Lodgepole pine killed by mountain pine beetle on Kootenai Forest.--W. D. Bedard, of the Coeur d'Alene, Idaho, laboratory, reports that an infestation of the mountain pine beetle, which since 1924 has been killing lodgepole pine trees in the South Fork of the Yaak River on the Kootenai National Forest, has now destroyed nearly all of the lodgepole pine timber in that area. This timber stand was an important watershed protection, primarily because fires have destroyed much of the timber in the North Fork section. This leaves the headwaters of this river with very little cover to control the run-off from the large area which it drains.

Forest-insect exhibit at county fair.--J. C. Evenden reports that during September the Coeur d'Alene laboratory, in compliance with the request of the Kootenai County Fair Association, presented an instructive exhibit which was received with very favorable comment by the thousands of spectators. The booth featured local forest-insect pests, showing their work, habits, and control, by means of fresh material, photographs, and descriptive placards. Visitors were attracted by a large glass tube filled with living mountain pine beetles and by logs with some of the bark removed to demonstrate the work of the different species of bark beetles.

PLANT DISEASE CONTROL

Barberry eradication.--During the past year field tests have been conducted in Colorado to determine the most practical means of killing Berberis fendleri, a native species of barberry found in the grain-growing areas of the southwestern part of the State. Among the several chemicals tried, Atlacide applied as a spray and soil drench has proved very effective. Twenty relief laborers are now operating knapsack sprayers, using 8 pounds of Atlacide in 5 gallons of water on plots 1 rod square where the barberries are growing in large patches. There is also indication that from 30 to 40 pounds of salt in solution, when applied to plots 1 rod square, will give a satisfactory kill. Promising results have been obtained in the use of diesel oil in connection with the eradication of Berberis canadensis in southwestern Virginia. Oil was applied in quantities ranging from 2 to 15 gallons per plot of 40 square feet. Bushes on one series of plots were cut off, while those on another series were left standing. One-hundred-percent kills were obtained on all plots. All barberry seeds found in the soil on the plots treated with oil were observed to be completely decayed. The seeds could be easily crumbled between the thumb and finger. It appears that the oil penetrates the seed coat, destroying the embryo. It is estimated that the damage to wheat from stem rust in the San Juan basin in southwestern Colorado amounted to 15 percent this year, whereas in the irrigated sections along the eastern slope of the Rocky Mountains only a trace of rust occurred. Harry Atwood, in charge of barberry eradication in Ohio, reports that since August 1, 1935, laborers employed with emergency funds have made possible the eradication of 260,000 barberry bushes on more than 7,200 square miles in 30 counties. The area covered consisted of waste and wooded lands along river banks, fence rows, and woodlots in cultivated areas, and city properties. The expansion of the work with emergency funds has made it possible to bring under control many of the larger areas of infestation in Ohio. Since August 1935 laborers employed with emergency funds in Nebraska have made an inspection of more than 8,000 square miles for barberry bushes. Survey work has been completed in the following counties: Burt, Cass, Cedar, Dodge, Douglas, Gage, Jefferson, Nemaha, Otoe, Pawnee, Richardson, Saline, Thurston, and Washington.

Blister rust notes from the Southern Appalachian States.--The year 1936 has been one of unseasonable dryness, which has retarded the general spread of the rust in the three Southern States known to be infected, namely, Maryland, Virginia, and West Virginia. Only one new infection center has been reported this summer and that was on a single small pine in the Massanutten division of the George Washington National Forest in Page County, Va. The infection was apparently 10 years old. Blister rust cankers on pine have been found by the hundreds in the Shenandoah National Park, particularly at Skyland and at Elk Wallow, along Skyline Drive. A total of 3,294 pine cankers were removed this summer from 600 pines which have a high ornamental value in the Park. In addition, 98 trees were removed because they were so badly infected that they could not be saved by cutting out the diseased parts. During July and August _Ribes_-eradication crews in the six Southern Appalachian States destroyed 1,519,901 currant and gooseberry bushes on 435,340 acres.

Aecial stage of blister rust found in September.--G. O. Hill, blist r rust control agent in Wisconsin, reports the finding of two blister rust cankers in the "fruiting" or aecial stage on a white pine in September. A few similar cases have been reported in the past as late in the fall as October and November, but they are comparatively rare. Ordinarily the aecial stage on pine is completed during the spring, from March to June. It is not known whether these two cankers fruited in the spring.

Menominee Indians donate huge white pine log to Wisconsin State Fair.--A part of the white pine blister rust control exhibit at the Wisconsin State Fair, held in Milwaukee the latter part of August, included a huge white pine log, measuring 54 inches in diameter and 20 feet long, which was donated by the Menominee Indians as a permanent exhibit at the State Fair Grounds. This log came from a northern white pine tree 281 years old, 140½ feet in height, and over 6 feet in diameter at base of stump. The pine was grown on the Menominee Indian Reservation.

COTTON INSECT INVESTIGATIONS

Abundance and distribution of cotton leaf aphids.--Leaf aphids have been unusually abundant this year on cotton in many parts of North Carolina, South Carolina, Georgia, Mississippi, Louisiana, Texas, and Arizona. An exception to the heavy general infestations was the Delta section of Mississippi, where the infestation was about normal. Three species, the cotton aphid (_Aphis gossypii_ Glov.), the cowpea aphid (_A. medicaginis_ Koch), and the potato aphid (_Illinoia solanifolii_ Ashm.) were present. Although the distribution and abundance of the cowpea aphid on cotton was not determined for all sections, this species was more abundant than the cotton aphid in many fields of South Carolina, especially where the cotton was adjoining, or on land planted to legumes last year. The infestation was general in the eastern and central parts of the State and control measures were necessary in some fields as early as May. Heavy infestations developed on fields that had not been treated with arsenicals for boll weevil control. More inquiries were received from the Gulf coast of Texas concerning aphids than any other insects early in the season. Stands were ruined and plants stunted in many fields. The infestation diminished during the early summer, but with the heavy dusting with arsenicals the infestation increased to the danger point during the latter part of July. In most fields the cotton aphid was the abundant species, but the potato aphid was recorded on cotton from several localities in Texas.

Control of cotton aphids difficult.--K. P. Ewing, Port Lavaca, Tex., reported as follows concerning control tests against aphids on cotton foliage: In southern Texas the cotton aphid becomes a real problem when calcium arsenate is used to any extent. Damaging infestations of this insect almost invariably follow after three or four applications of calcium arsenate have been made to cotton during dry weather. This year, owing to widespread dusting for leaf worms, the cotton aphid became injurious in many fields.

Lead arsenate spray vs. calcium arsenate dust for boll weevil control.--Mr. Ewing also states: "During the past 4 years the cotton leaf worm has required control measures early in the season in the Texas Gulf coast section. Usually from three to six or seven applications of some arsenical are necessary to give seasonal control of this insect. Some farmers in this section use lead arsenate as a spray while others use calcium arsenate as a dust, both of which are satisfactory for leaf worm control. Ordinarily 4 pounds of lead arsenate are mixed with 50 gallons of water and this amount of spray covers from 3 to 4 acres. This makes the cost of the lead arsenate spraying about 15 cents per acre application. From 6 to 7 pounds of calcium arsenate are usually used per acre, making the cost of this control method approximately 45 cents per acre."

Blister mites of the genus Eriophyes.--L. C. Fife, Mayaguez, P. R., reports that blister mites of the genus Eriophyes (det. H. E. Ewing) attack two malvaceous plants, Bastardia viscosa and Malachra capitata, causing blisters similar to those made on cotton by the West Indian blister mite (Eriophyes gossypii Banks). Several attempts to get these blister mites to attack cotton have failed, indicating that the species causing blisters on Bastardia viscosa and Malachra capitata are different from Eriophyes gossypii of cotton.

Flea hopper egg parasites widely distributed.--Evidence of the wide distribution of the egg parasites of the cotton flea hopper previously mentioned (See Sept. 1, 1936, News Letter, vol. 3, no. 9) is reported by K. P. Ewing and H. J. Crawford of Port Lavaca. One hundred and twelve samples of croton plants were collected in six States and were sent to Port Lavaca for observation. Each sample consisted of 10 croton plants stripped of leaves, leaving the stems and woody parts in which the flea hopper eggs are laid. Parasites emerged from material from each State, though varying considerably in abundance. The highest average percentage of parasitization was found in South Carolina, with 89.2 percent from 4 samples. From Texas there was an average of 34.4 percent parasitization in 70 samples; from Louisiana, 6.5 percent in 7 samples; from Arkansas, 5 percent from 2 samples; and from Mississippi, 0.1 percent in 10 samples. Emergence was incomplete in the sample from Arizona but a high percentage was indicated. The average for all the samples for which emergence was complete was 23 percent. The 70 samples from Texas were collected in 18 counties in eastern Texas, extending for a distance of about 400 miles north and south.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Gin-trash inspection.--Gin-trash inspection has gone forward satisfactorily throughout September. All trash produced in the regulated area of Florida has been inspected and large quantities in southeastern Alabama, southern Georgia, and that part of Florida outside the regulated area. The results have been negative all season. A machine has been operated in the Corpus Christi section of Texas, which is north of the lower Rio Grande Valley, where a new infestation was found in August. A very good top crop is being produced in the Corpus Christi section, hence these inspections are of considerable importance. No indications of pink bollworm have been found. In west-central Texas six machines have been operated, results being negative throughout September. The first part of October the inspection of trash in the regulated part of the Western Extension of Texas was begun, also in sections just outside the regulated area. At Midland, within the regulated area, two specimens of the pink bollworm have just been found, and two specimens at Big Spring, just outside the regulated area. These are the first specimens to be found in the Western Extension since the 1934 crop season. A gin-trash crew has worked across northern Louisiana and is now operating in the Delta section of Mississippi. Another crew is operating in Kern and Tulare Counties in California. Both of these latter crews have had negative results. In the Mesilla Valley of New Mexico, within the regulated area, some trash has been inspected with a hand machine from time to time, and three specimens of the pink bollworm have been found. Either gin-trash or boll inspection is carried on each season from the older regulated areas to reestablish the infestation and also obtain some idea as to the degree.

Wild cotton eradication.--The five small W. P. A. crews have continued with the eradication of wild cotton in southern Florida throughout September. These crews seem to be doing excellent work and are engaged principally in the recleaning of areas to prevent seedling plants maturing fruit before work is resumed on a larger scale this fall. During the month they have been recleaning some 2,450 acres in six different counties. From this area 253 mature, 57,351 seedling, and 1,340 sprout plants were removed. A new colony covering about 1 acre, and consisting of 3 mature and 123 seedling plants, was found and destroyed. In addition to the above acreage, over 9,000 acres were gone over without encountering any wild cotton.

Thurberia plant eradication.--The eradication of Thurberia plants in the Santa Catalina Mountains of southern Arizona has continued to go forward satisfactorily. Part of the month was devoted to working the foothills, where very few plants were encountered. It was necessary, however, that this area be covered to avoid leaving any plants whatever. This work is being carried on with W. P. A. funds to remove the menace of the Thurberia weevil, which infests these plants, from cultivated cotton. During September 17,200 acres were covered and 81,746 Thurberia plants destroyed.

Road-inspection station.--The first of September a road-inspection station was opened at the junction of the Presidio and Ruidosa roads, about a mile and a half south of Marfa, Tex. For the past several years this station has been operated during the cotton-picking season to prevent unauthorized cotton products being carried from the heavily infested Big Bend section. The station is being operated on a 24-hour basis. On September 14 two lots of seed cotton were intercepted and a dead pink bollworm larva was found in each lot. On October 3, 75 locks of seed cotton were taken from a truck. In this seed cotton six living and nine dead larvae and three living pupae of the pink bollworm were found. This truck had been hauling seed cotton in the Big Bend, and as it was a commercial truck would doubtless have gone to any part of the State where loads could be obtained. The above interception was therefore of considerable importance.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Decomposition of derris when applied to bean foliage.--N. F. Howard, of the Columbus, Ohio, laboratory, reports some rather interesting results from a cooperative experiment with other field laboratories of the Bureau to determine the lasting effects of derris on bean foliage. Bean plantings were made at the following locations throughout the United States: New Haven, Conn., Norfolk, Va., Columbus, Ohio, Baton Rouge, La., Madison, Wis., Manhattan, Kans., Grand Junction, Colo., Twin Falls, Idaho, Ventura, Calif., Corvallis, Oreg., Puyallup, Wash., and Phoenix, Ariz. These plantings were treated with a derris spray and samples of leaves were taken at given intervals and sent to Columbus for analysis. In every case derris was recovered in sufficient quantities at the end of 2 weeks to be detected by the colorimetric and goldfish methods. At Madison, Grand Junction, Twin Falls, Corvallis, and Columbus, derris showed a slower loss of toxicity than at the other laboratories. Light alone does not seem to account for the decomposition rate, neither does high humidity. At Phoenix, where daily temperatures averaged over 100° F., derris was recovered after 10 days. At Ventura, where no rain fell during the test, all of the toxicity had disappeared at the end of 4 weeks. During this test period Ventura had 9 foggy days. This is the only laboratory where fog was reported during the test.

Tomato pinworm favors lower surface of leaf for egg laying.--In laboratory studies conducted by R. E. Campbell, of the Alhambra, Calif., laboratory, on the biology of Gnorimoschema lycopersicella Busck, pinworm moths were confined to a single tomato plant with a screen cage. After 3 to 4 days the plant was examined for eggs and the place of occurrence tabulated. Four experiments, using four tomato plants, were conducted. The results indicated that 57.4 percent of the eggs were deposited on the lower surface of the leaf, 40.8 percent on the upper surface, and 1.8 percent on the petioles. No eggs were deposited on other parts of the plant. In an effort to determine the importance of treating the lower rather than the upper surface of tomato leaves infested with the tomato pinworm, 204 leaf folds were collected in an infested tomato field and were examined to determine which surface of the leaves was folded. It was found that 91 percent of the leaves were folded on the upper surface, and only 9 on the under surface.

Biology of tobacco hornworms.--Studies conducted by F. S. Chamberlin and A. H. Madden, of the Quincy, Fla., laboratory, on the biology of Protoparce sexta Johan., developed the following data: Three broods of larvae occur in the Quincy district during the summer. This is the first definite record showing the existence of a third brood of this insect at any point within its known range. Records from 23,222 eggs deposited in cages and 185 eggs deposited in the field show that almost three times as many eggs are laid on the bottom of the leaf as on the top, and that the greatest number of eggs are laid on the top leaves of the plant. The normal number of instars was found to be five, but 21 percent of the first brood had six instars. The average depth of burrowing for pupation of 361 individuals was 4.51 inches. Longevity records obtained from 78 moths in captivity place the maximum length of life of the male at 10 days and the maximum length of life of the female at 16 days.

Adult lima bean pod borers attracted by lights.--Phototropic studies conducted by Rodney Cecil of the Ventura, Calif., laboratory, in cooperation with the University of California, against Etiella zinckinella Treit. in the field, showed that a large numbers of adults were attracted to the different lights. The largest number of adults were attracted to the high intense white light, and to the pale blue light. The red light was only slightly attractive. The sex ratio of adults captured was 60 percent males and 40 percent females, although collections in the fields made with nets show the sexes to be in approximately equal ratio. The females, when dissected, were gravid in 90 percent of the cases. The use of the different lights did not prove of much value as a control, as beans in the vicinity of the lights show a large percentage of the pods wormy, although in this field of 2½ acres the two traps in operation 41 nights have caught 10,405 adult pod borers.

Lime does not reduce infestation of larger bulb fly in narcissus plantings.--Experiments were conducted during 1936 in two plantings of narcissus bulbs, by C. F. Doucette, of the Sumner, Wash.,laboratory, to determine the possible effectiveness of lime in reducing infestations of the larger bulb fly (Merodon equestris Fab.). In field No. 1 six blocks of treated bulbs, 50 feet long and 10 rows deep, alternated with six untreated checks 100 feet long and of the same depth. The lime was applied at the rate of 5 pounds to each 50 feet of row. In field no. 2 the application was made on a block in the middle of the planting. Ten rows were treated in each plot for a distance of 50 feet. The plots were arranged in two parallel lines, semicheckerboard style. In field No. 1 samples were taken from each row in both check and treated blocks, and in field no. 2 samples were taken of the five rows in the center of each plot, in order to eliminate marginal influences. Each row sample was examined for infestation on the basis of 100 bulbs. Both plantings had heavy infestations in 1935. There was apparently no significance in the differences of infestation between the treated and untreated lots. Not only did the probable errors exceed the differences, but in the two fields the differences were in opposite direction. The conclusion is apparently justified that the application of lime does not appreciably affect the degree of infestation.

Parasite aids in control of Colorado potato beetle in Ohio.--B. J. Landis, of the Columbus, Ohio, laboratory, reports that approximately 7.5 percent of Colorado potato beetle larvae collected at Columbus and South Point, Ohio, during the period June 8 to July 2 were parasitized by the tachinid Doryphorophaga doryphorae Riley.

Hot-water treatment of Delphinium belladonna hybrid plants for control of cyclamen mite.--In an experiment conducted by F. F. Smith, of the Beltsville, Md., laboratory, on the control of Tarsonemus pallidus Banks on delphinium plants under conditions simulating the commercial practices of forcing this crop in the greenhouse, plants, infested with mites and grown in the field during 1935, were dug in March 1936 and planted in the greenhouse, where they were grown to flowering stage in May. The plants in three groups, (a) untreated, (b) immersed in water for 20 minutes at 110° F., and (c) immersed for 30 minutes before planting, started into rapid growth in the greenhouse. Leaves in some of the plants immersed for 30 minutes showed injury at the margins as they expanded and these plants were somewhat delayed in their growth, as compared with the untreated plants or those treated 20 minutes. The results of these tests revealed that the plants subjected to the 20-minute immersion attained an average height of the flower spike of 31.2 inches, those subjected to the 30-minute immersion attained a height of 26.4 inches, and the untreated checks a height of 29.1 inches. Measurements also showed that the flower spikes on plants treated for 20 minutes were higher than those treated for 30 minutes or on untreated plants. In the untreated plants the stunting effect of the mites is undoubtedly the cause of the shorter growth.

Wireworm infestation controlled by summer flooding in Washington.--D. W. Jones and K. E. Gibson, of the Walla Walla, Wash., laboratory, report that, as a result of flooding a potato field after harvest for a period of 1 week, 100 percent of the wireworms Limonius canus Lec. contained therein were killed. There were, on an average, 19.8 wireworms per square foot in this field before flooding. The fact that soil temperatures in the area flooded during the period involved averaged approximately 73° F. at depths of 6, 12, and 18 inches, respectively, was an important contributing factor in the effectiveness of the treatment.

Imported cabbage worm larvae prove susceptible to very low concentrations of cube.--In laboratory tests directed against quarter-grown larvae of the imported cabbage worm (Ascia rapae L.), C. B. Wisecup, of the Sanford, Fla., laboratory, reports that a dust mixture containing 0.055 percent rotenone was very effective in killing the larvae of this species and that this dilution is the most suitable of any of the dilutions tested for use in obtaining comparative results of the reactions of insecticides to A. rapae larvae.

INSECTS AFFECTING MAN AND ANIMALS

Natural dissemination of blowfly parasite.--A recent survey by A. W. Lindquist in the vicinity of Uvalde, Tex., shows that the larval blowfly parasite Alysia ridibunda Say has spread for a distance of 27 miles from the point of original release in the fall of 193[illegible].

Summer migration of primary screwworm fly from Texas.--Studies by D. C. Parman and W. L. Barrett, Jr., indicate that *Cochliomyia americana* Cushing and Patton migrated from the northern limit of the area in which it overwintered in Texas, in the vicinity of Uvalde, to the southern border of Kansas, a distance of about 525 miles, during the period from March 5, 1936, to August 1, 1936. This rate of travel was west of an approximate north-and-south line from San Antonio through Hillsboro, Dallas, and Fannin County, Tex. East of this line migration northward and eastward was apparently inhibited by heavy rains until July 15, when hot, dry weather favored the northward and eastward dispersion at nearly the same rate as that which occurred west of the line.

Screwworm myiasis in wild animals.--An examination of 298 cottontail rabbits and 205 jack rabbits in the vicinity of Uvalde, Tex., by A. W. Lindquist in May, June, July, and August showed approximately 4 percent of these animals to be infested with larvae of *C. americana*. During this same period 7 infestations in opossums and 4 in deer were also found.

Survey of screwworm incidence in Arizona.--A survey of the screwworm situation made by C. C. Deonier in Yuma, Pinal, Pima, Santa Cruz, Cochise, Gila, Greenlee, Apache, Navajo, and Maricopa Counties, Ariz., indicates that in some areas there are considerable numbers of screwworms each year, whereas other areas have infestations only periodically during certain seasons. The areas generally infested are in the brushy sections along the escarpments to the mountains, but the open country is subject to infestations during the rainy season. The high mountain areas above 6,000 feet are rarely, if ever, infested.

Repellents for screwworm flies.--E. R. McGovran, of the Valdosta, Ga., laboratory, reports that preliminary field tests with a mixture of pine-tar oil 85 percent, acetone 10 percent, and derris resinate 5 percent, and a powder containing tannic acid 40 percent, phenothiozine 50 percent, and m-cresol 10 percent indicate that both these mixtures exhibit a greater repellency to screwworm flies than does pine-tar oil alone.

Soil treatment for destruction of primary screwworm pupae.--Investigations by E. F. Knipling and A. L. Brody on methods for destroying pupae of *C. americana* in the soil have shown the relative value of the following materials:

Treatment	Relative value	Flies emerged
		Number
Sodium cyanide (2 oz. in 1 gal. water)	1	0
Sodium cyanide (2 oz. in 2 gal. water)	2	0
Sodium cyanide (1 oz. in 2 gal. water)	3	0
Carbon disulphide (1 qt.)	4	0
Carbon disulphide emulsion (Equal parts with neutral sulphonated castor oil) (1 qt. in 2 gal. water)	5	0
Carbon disulphide emulsion (1 pint in 2 gal. water)	6	0
Fire (approximately 1/20 cord of wood used)	7	0
Kreso dip (1/2 pt. in 2 gal. water)	8	3
Kerosene (1 gal.)	9	8
Paradichlorobenzene (4 oz.)	10	20
Five-percent phenol solution (water), (1 gal.)	11	25
Waste crank-case oil (1 gal.)	12	43
Kerosene oil emulsion (20-percent strength), (2 gal.)	13	75
Lime sulphur (1/2 lb. in 2 gal. water)	14	84
Control 1, 2, 3	15	62, 68, 95

Larvae were confined in areas of 1 square yard on Bermuda grass sod. Treatments were made on the fifth day after the larvae were placed on the soil.

Viability and longevity of mosquito eggs.--H. H. Stage and C. M. Gjullin, working at Portland, Oreg., report the following observations: "Soil and debris containing eggs of *Aedes vexans* Meig. and *A. aldrichi* Dyar and Knab were placed on the ground of a screened outdoor cage in May 1935. During the first week of June and the first week of September of each year, 12 samples of this material are flooded to determine how long the eggs may remain viable. To die the following hatches have been recorded: June 1, 1935, *A. vexans*, 2,357, *A. aldrichi*, 2,097; Sept. 1, 1935, *A. vexans*, 1,723, *A. aldrichi*, 368; June 1, 1936, *A. vexans*, 2,665, *A. aldrichi*, 131; Sept. 1, 1936, *A. vexans*, 358, *A. aldrichi*, 51."

Effect of continuous inundation on winter-dormant mosquito eggs.--Messrs. Stage and Gjullin state that eggs of *A. vexans* and *A. aldrichi* have been found to be dormant during the winter months and do not hatch unless warmed and dried for several days before flooding. Samples of soil and debris containing eggs of these species were placed in containers and kept flooded under outdoor conditions from January and March until May. During this period, 2.2 percent of the *A. vexans* and 5.7 percent of the *A. aldrichi* eggs hatched. Rising temperatures in April ended the winter dormant period and areas flooded by the rising rivers produced large hatches in the field by May 1. The samples mentioned above were then dried and reflooded in May, whereupon a normal hatch was noted. Evidently the eggs were not injured by this 3-month period of inundation. These observations were confirmed in one instance in nature. To learn of the effects of a longer period of inundation, a portion of the samples were kept continuously flooded from March until August 10. No hatching occurred during this interval. The samples were dried and reflooded at this time and a 15-percent hatch of *A. vexans* and a 35-percent hatch of *A. aldrichi* were obtained. Six months inundation had apparently destroyed 85 percent of the *A. vexans* and 65 percent of the *A. aldrichi* eggs.

Temperature required to prevent infestations of fabrics by webbing clothes moth and black carpet beetle.--Preliminary studies by Wallace Colman, of the Beltsville, Md., laboratory, on the effect of temperature on the development of *Tineola biselliella* Hum. and *Attagenus piceus* Oliv. show that 100-percent mortality of first-instar larvae of *T. biselliella* exposed at 15° C. and 42 percent relative humidity occurs. This indicates that an infestation could not become established at this temperature and humidity. The most important point with respect to *A. piceus* is that this species does not oviposit at 15° and 42 percent relative humidity. This indicates that this species could not become established at this temperature and humidity. Thus, so far as these two species are concerned, the results indicate that material kept at 15° and 42 percent relative humidity would remain free of infestation. The data indicate that the threshold of development for these two species lies between 15° and 20° C. at 42 percent relative humidity, when the life cycle is initiated by the introduction of adults taken from cultures kept at summer room temperatures.

Dallas laboratory moved to new quarters.--The laboratory formerly located at 4529 Reiger Ave., Dallas, Tex., has been moved to a new location on the west bank of the Trinity River, overlooking the business section of the city. The laboratory on Reiger Avenue was opened in 1905 and was for many years headquarters for the old Division of Southern Field-crop Insect Investigations. Since about 1915, however, the work has been devoted almost entirely to the studies of insects affecting the health of man and animals. With the growth of the city and the complete surrounding of the laboratory by residences, many of the investigations of the division have been restricted. The abandonment of the laboratory at Reiger Avenue marks the passing of perhaps the oldest laboratory in the Bureau in point of continuous occupancy of the same quarters. The address of the new location is Corner East Eighth St. Road and Corinth St., Oak Cliff, Dallas, Tex.

Degree of parasitization of the American dog tick by Hunterellus hookeri How.--C. N. Smith and Helen Louise Trembley, studying the habits of the tick parasite *H. hookeri*, observed that a higher degree of parasitization was obtained when ticks were exposed on the host, after having been attached for 2 days or longer. Parasites which had been emerged for 2 days and those emerged only $2\frac{1}{4}$ hours seemed equally effective. In two cases, one on the host and one with ticks that had dropped, one female parasitized eight ticks. Eighteen males and 76 females emerged from five nymphs of *Dermacentor variabilis*, an average of 19 parasites per nymph.

Poisoned baits tested for control of fire ants.--B. V. Travis reports the following results in tests to determine the value of poisoned baits for the destruction of fire ants: "Of the baits tested, canned corned beef, evaporated milk, cheese, cow's milk, peanut butter, egg yolk, and cow's butter were the most attractive to the fire ants. Although sweet foods were somewhat attractive to ants, in general milk and milk products were the most attractive in these tests. The ants were considerably attracted to greasy foods. Since canned milk and canned corned beef were found highly attractive to fire ants, a mixture of these two substances with sodium arsenite was tested. When sodium arsenite was present in very small quantities (0.025 percent), fire ants consumed the food readily, but when the bait was changed to 0.25 percent sodium arsenite the ants ate sparingly and in a few minutes covered the bait with dirt. Very few dead ants were observed around the colonies thus treated and no reduction in numbers could be noted."

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Twenty-four living larvae of the West Indian fruit fly (*Anastrepha acidusa* Walk.) were collected on June 5 in mangoes in the field at Bayamon, P. R. A living larva of the Mexican fruit fly (*Anastrepha ludens* Loew) was intercepted at Laredo, Tex., on July 3 in a guava in baggage from Mexico, and a living larva of the same fruit fly was taken at Brownsville, Tex., on July 18 in an avocado in baggage from Mexico. Living specimens of the aphid *Myzus ornatus* Laing arrived at New York on May 11 on *Ricinus* leaves in ship's quarters from England. The name *Myzus veronicae* Del G. has been used in the past for this species. A living larva of the West Indian sweetpotato weevil (*Euscepes batatae* Waterh.) was taken at Boston on July 6 in a sweetpotato in stores from St. Vincent, Lesser Antilles. Adults of the bruchid *Bruchus emarginatus* Allard were intercepted at Washington, D. C., on June 23 in seed of pea (*Pisum sativum*) in the mail from Peshawar, India. A living adult of the elaterid *Conoderus bifoveatus* Palis. arrived at New Orleans on May 5 on a pineapple in cargo from Cuba. Seven living adults of *Pachymerus olearius* Bridwell were taken at New York on July 15 in seed of *Attalea excelsa* in cargo from Brazil. Two hitherto known hosts of this bruchid are *Acrocomia sclerocarpa* and *Orbignya speciosa*. Living larvae of the turnip gall weevil (*Centorhynchus pleurostigma* Marsh.) and the chrysomelid *Psylliodes chrysocephala* L. were intercepted at Philadelphia on July 1 in white turnips in stores from Scotland. Living specimens of *Haplothrips setiger* Pr. arrived at Baltimore on March 19 in packing about cedar and violet plants in the mail from Germany. A living adult of the weevil *Orchidophilus peregrinator* Buch. was taken at San Francisco on May 7 in an orchid, *Vanda luzonica*, in baggage from the Philippines. A living adult of the banana root borer (*Cosmopolites sordidus* Germ.) was intercepted at Laredo, Tex., on July 23 with banana debris in cargo from Mexico. A living adult of the lyctid *Minthea rugicollis* Walker was taken at Brownsville, Tex., on May 27 on a pineapple in baggage from Mexico. W. S. Fisher reports as follows: "This is an oriental species. Its natural habitat is probably the Philippines, Siam, China, Ceylon, and the Malay region. It has been introduced into Europe, West Indies, and Hawaii. Hopkins and Kraus record it from Missouri and it has been intercepted in wooden cases from India, both at New York and at Philadelphia."

Finding fruit fly in pockets.--That pockets, whether they are in the coat of a lady or the suit of a man, may be the hiding place of fruit fly was illustrated recently when the Puerto Rican ship Borinquen unloaded its quota of passengers in New York on September 14. As it came from fruit fly sections of the West Indies, its passengers received more than casual inspection. It was at the gate that the Plant Quarantine Inspector suggested that a lady, leaving with her baggage, show what she had in her coat pocket. She did. It was a contraband mango in which was found a fruit fly, later determined as Anastrepha sp. A male passenger, perhaps not to be outdone by the female of the species, held his hand in his pocket as though nonchalantly fingering a handkerchief. His pose failed when the inspector suggested that he remove his hand and, seeing that the bulge still remained in the pocket, had him take out a package that contained nisperos, in which no signs of infestation were noted. Such frequently occurring incidents show the possibilities and ease with which fruit fly may be carried into this country.

Pink bollworm found in seeds related to cotton.--Routine inspection of cargo at the Appraiser's Store, port of New York, revealed a 26½-pound shipment of Abelmoschus (Hibiscus) manihot seed from Brazil. Among other things, a living larva and a dead pupa of the pink bollworm were taken out of this shipment of seeds. The larva was found in the characteristic "webbing" together of several seeds. No indication of the larva being completely embedded in the seed was noted, as the seeds are too small for a larva to feed in a single one. The dead pupa was found in the "webbing." Evidently, the pink bollworm had been feeding in the seed pods of the hibiscus plant and when the seeds were harvested the bollworms accompanied them to their destination. The finding of pink bollworm in this host would indicate that this insect may be introduced into this country by shipments of seeds of plants related to cotton. The shipment was fumigated.

Mislabeled "clothing".--A recent mail interception made at Boston, Mass., arrived at the Washington, D. C., Inspection House declared as "overalls and shirt", with no mention whatever that the package contained plant material. Upon examination of the contents of the parcel at the Inspection House, no wearing apparel was found; instead, an assortment of 49 miscellaenous plants and bulbs, including caladium, impatiens, begonia, aralia, fern, and asparagus. This collection of plant material invoiced as overalls and shirt was forwarded by a man who was vacationing, apparently, in Bermuda, to himself at New Bedford, Mass. This case appears to be a rather clumsy method of importing plants in violation of plant-quarantine laws, especially when foreign packages are so carefully examined and appraised by customs officials.

Pathological interceptions of interest.--Anguillulina dipsaci (Kuhn) Gerv. and v. Ben. was intercepted from Portugal for the first time on September 18 at Houston in potato. Interceptions of this nema are being made in bulbs from Europe. Bremia lactucae E. Regel was intercepted on globe artichoke for the first time on September 15 at New York in stores from France. Cephalosporium sp., unlike any species with which the specialists were familiar, was intercepted on apples from Australia on August 18 at New York. Heterodera marioni (Cornu) Goodey was intercepted in parsnips from Trinidad on September 17 at New York. The first interception of Leptosphaeria tritici (S. Gorovaglio) Pass. was made at Baltimore on September 4 on wheat straw around bottles. Mycosphaerella brassicicola (Fr.) Lindau was intercepted from Italy at New York on August 6 on cabbage and on broccoli greens. Uromyces betae (Pers.) Lev. was intercepted at New York on September 8 on beet leaves from Chile. Arthur's Manual does not include South America in recording the distribution of this rust.

DOMESTIC PLANT QUARANTINES

Japanese beetle intercepted in shipment of cut flowers.--A Japanese beetle was recently found by the Philadelphia inspectors in shipment of cut flowers. Although the beetle was quite cold and apparently dead, it soon became active after removal from the iced container. Inspectors at New York recently found a bag of live insects in the mail shipped in apparent violation of the Insect Pest Act. The shipment was reported to the proper authorities.

Port inspectors report violations of domestic quarantines.--Cooperative arrangements have recently been made with the Division of Foreign Plant Quarantines whereby plant material, originating in the United States and carried by travelers into Canada and back into this country through Detroit in violation of Federal domestic quarantines, will be brought to the attention of a transit inspector. The arrangement is the result of an interception reported by a port inspector at Detroit. This uncertified shipment contained white pines, spruce, and other plants with soil and was being carried in an auto from the Adirondacks to Illinois, via Canada and Detroit.

Transit-inspection activities at Chicago.--The volume of inspection work carried on at Chicago is shown in a recent report from J. M. Corliss, inspector in charge, in which it is stated that 230 trains arrive daily carrying an average of 22,470 sacks of parcel post, all of which are reworked in the new post office building. The 2,000 segregation clerks, sorting packages for transfer to various States, have become very skillful in detecting plant shipments which are then held out for transit inspectors to examine. Approximately 400 express cars, Mr. Corliss states, pass through Chicago daily for Chicago delivery or for sorting at the nine different terminals in the city where transit inspectors examine the shipments for compliance with the restrictions of Federal domestic plant quarantines. Nineteen railways carrying freight shipments have cooperated in transit inspection by providing information daily by means of waybills and telephone calls as to shipments of nursery stock, Christmas trees, stone, sand, and other materials passing through the local freight transfer points. Large quantities of produce from the areas infested with the Japanese beetle were made available for inspection in this manner during the summer, and it was necessary to hold freight shipments of more than 3,000 baskets of green beans, as well as other produce, until it was determined whether they were eligible for certification at origin. The examination of railway cars for cleanliness requirements under quarantine regulations has included the inspection of vegetable bunkers and refrigerator cars, which might contain decayed produce.

Phony peach tree removal intensified in Georgia.--"The phonies are certainly coming out", according to the project leader, who reports that all relief labor available for the eradication of diseased peach trees in Georgia has been concentrated in crews following Federal and State inspectors, removing such trees as rapidly as they are located. Over 60,000 "phony" trees were removed from this important peach-producing State in the period from July 1 to September 19, as compared with about 40,000 in the entire fiscal year 1936. There has been a decrease in the number of laborers available for the work, owing to the absorption of many men on relief rolls by local activities. Eradication work is also under way in Alabama, Arkansas, Illinois, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, and Texas.

Citrus canker inspection.--Although several properties in the Galveston area of Texas showed some recurrent infections of canker on seedlings, on being reinspected in August and September, no canker was found in Jefferson County when reinspection was made in August in the vicinity of the six properties near Hamshire, which last winter were found to be badly infected with canker. All citrus trees were destroyed in the course of inspection. Twenty-one counties in Texas have been inspected since the first of July by the corps of Federal and State inspectors and no canker has been found outside the counties of Galveston, Brazoria, and Harris. Inspection has recently been started in Alabama and Mississippi. In Louisiana the reinspection of eight parishes since July 1 resulted in finding no infections, with the exception of the case of canker found on an island in Terrebonne Parish in July.

Pink bollworm quarantine modified.--The domestic Federal quarantine relating to the pink bollworm of cotton was modified, effective October 14, by releasing from restriction all parts of the State of Florida which were formerly under regulation. No pink bollworm infestation has been found in regulated areas in Florida during the intensive inspections of the 1935 and 1936 field seasons.

INSECTICIDE INVESTIGATIONS

Patent granted on new organic insecticide.--Under date of August 4, 1936, the Patent Office granted to L. E. Smith U. S. Patent No. 2049725, covering a class of organic materials known as diaryl thioxins, with particular reference to the compound phenothioxin $S:(C_6H_4)_2O$, which is lethal to mosquito larvae at a concentration of two parts per million parts of water and which, when used with bentonite and a wetting agent, was more effective than lead arsenate against codling moth larvae in some laboratory tests.

New thermoregulator developed.--L. D. Goodhue, Beltsville, Md., has described in Industrial and Engineering Chemistry (vol. 8, no. 5, p. 387, Sept. 15, 1936) an improved device for controlling the temperature of rooms and cabinets. It comprises a glass apparatus containing mercury and a volatile liquid such as pentane, so arranged as to act as a differential manometer in response to changes in the vapor pressure of the organic liquid. Its advantage lies in the fact that it is very sensitive, and will handle rather large currents directly without a relay. One model has been used at the Beltsville laboratory directly in series with a heater drawing 12 amperes at 110 volts, and has satisfactorily controlled that load for months at a time. A patent has been applied for.

New process for preparing pyrethrins patented.--The investigations of pyrethrum being conducted by F. B. LaForge and H. L. Haller, Washington, D. C., led these investigators to the discovery of a method of preparing concentrates which contain appreciably more of the active principles than heretofore available, and this process has now been granted U. S. Patent 2050974, issued August 11, 1936. The process consists essentially in dissolving commercially available oleoresin (the material extracted by petroleum ether from the flowers) in glacial acetic acid and then diluting somewhat with water, whereby much of the inactive material is precipitated as a mass of wax or fat, which is solidified by cooling and removed by filtration. Further dilution of the filtrate precipitates an oil, the ether-soluble part of which can be decolorized and recovered in the form of a light yellow oil containing from 60 to 65 percent total pyrethrins, as compared with about 30 percent in the original oleoresin.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Unusual habit of a cerambycid.--Among a collection of larvae taken from roots of Astragalus near Raton, N. Mex., and submitted by H. G. Byers, of the Bureau of Chemistry and Soils, were numerous specimens of a cerambycid. The plants were growing in soil rich in selenium, which, as Dr. Byers points out, is known to be poisonous to many plants and animals, including certain insects. The larvae were examined by A. G. Boving, who reports that they belong to the subfamily Lepturinae and probably to the genus Lepturus. The larvae of this subfamily, however, are found chiefly in decaying logs or dead heartwood of deciduous trees or under the bark of conifers. Larvae of the genus Desmocerus are known to occur in living roots of Sambucus; but there appears to be no previous record of a lepturine infesting the roots of Astragalus or other herbaceous plants. Instances of this kind indicate the desirability of definitely associating, by rearing wherever possible, the immature forms with adults.

A new record for an uncommon grasshopper.--The discovery of a nearly perfect female of the short-winged grasshopper (Paratylotropidia beutenmuelleri Morse) in the food contents of a turkey, taken near Staunton, Va., by the Biological Survey, suggests again the value of birds as collectors of insects. Described in 1907, this species was known only from three females until 1926. Since then several records have been added from South Carolina.

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The only previous Virginia record, however, is that of a male taken near Panorama. With the female recorded here were well preserved specimens of four other species of leaping Orthoptera.

Rediscovery of Saccharosydne saccharivora (Westwood) in United States.--Specimens of a delphacid, collected on sugarcane at Fellsmere, Fla., on September 26, by J. W. Ingram and E. K. Bynum, of the Division of Cereal and Forage Insect Investigations, have been identified by P. W. Oman as Saccharosydne saccharivora (Westwood). This appears to be the second record of S. saccharivora, a common West Indian species, occurring in the United States, it having been previously recorded by Van Duzee in 1909 from a single specimen collected at Tampa, Fla. Mr. Ingram stated that the species was causing rather severe injury to sugarcane at Fellsmere, and that nymphs were also found in small numbers on Digitaria sanguinalis, Paspalum urvillei, and Dactyloctenium aegyptium. References concerning saccharivora in the West Indies indicate that, although the species is common, it is usually not a severe pest of cane. Some of the nymphs included in this sending were parasitized by larvae of a dryinid, according to R. A. Cushman.

Records of new species of aphids belonging to the genus Amphorophora.--In a series of aphids submitted by W. W. Baker, of the Division of Truck Crop and Garden Insect Investigations, and collected on Rubus in the State of Washington, were four species of Amphorophora, three of which appear to be new species, according to P. W. Mason. The fourth species is Amphorophora maxima Mason, which has remained unknown since it was described in 1925 from California. In Mr. Mason's revisionary paper on this genus of aphids there are included eight species from Rubus, four of which were described in that paper as new. These latest acquisitions increase the number of known species on Rubus to 11. In this same lot from Mr. Baker there was also a new species of Amphorophora from Vaccinium. The only other species of this genus known from this host is Amphorophora vaccinii Mason.

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